Quality Assurance Guidelines
For Projects in
Texas State Agencies

Process for Project Planning

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1. PURPOSE OF THE PROCESS

The Project Planning Process provides a framework for software development and software maintenance teams to develop their project plans. Using the activities detailed in this process description and in supporting documents, project teams describe the work they will do, develop estimates of effort, develop a schedule, plan their management and technical approaches, identify measures to gather, and develop a risk management approach.

2. SCOPE OF THE PROCESS

The activities, roles and deliverables in the project planning process may be performed slightly differently for different types of projects. For further guidance on tailoring a process based on project characteristics, see *Tailoring the Guidelines* elsewhere in this manual.

2.1 ACTIVITIES TAILORING

The following tailoring tables provide suggestions for adaptation of the activities.

Activities	Low QA Focus	Medium QA Focus	High QA Focus
Tailor Life Cycle Model to Project	Attempt to make one delivery to customer	Delivery likely to be done in increments	Delivery generally done in increments
Establish Project Environment	Team likely to be co-located with existing environment	Team probably co-located, environment may need changes	Likely to have complex communication requirements, changes to environment
Create Work Breakdown Structure	Use task granularity <= 1 person week; built by project manager	Use granularity of tasks about 2 person weeks; built by project manager and small team	Use granularity of tasks about 4 person weeks for long range items; 2 person weeks for short range items; built in one or more facilitated team sessions
Identify Project Risks	Use a short list of key risks for identification	Use the appropriate risk factor table for identification	Use the appropriate risk factor tables for identification at the start of the project, and the beginning of each phase

Activities	Low QA Focus	Medium QA Focus	High QA Focus
Define Project Measures	Collect fundamental measures of size, defects, milestone attainment, effort	Collect fundamental measures and those needed to handle project issues	Collect fundamental measures and those needed to handle project issues
Allocate Work to Personnel	May not be necessary	Most personnel will perform multiple roles	Include buffer for team member turnover; may need senior management mediation of priorities
Develop Initial Project Schedule	Attempt to get level of confidence >80%	Attempt to get level of confidence >75%	Attempt to get level of confidence >70%
Complete Project Plan	Use concise plan formats	Use organization templates	Ensure plan is useful for project members added after project start

2.2 ROLES TAILORING

These roles in project planning may be handled differently for different types of projects.

Role	Low QA Focus	Medium QA Focus	High QA Focus
Project Manager	Person in this role is also likely to be a member of the team doing the work	Person in this role may also do some of the work of the team	Person in this role is dedicated to project management
Configura-tion Management	Role may be performed by project manager or a member of the team	Role may be performed by someone on the project team or someone from an independent group	Role likely to be performed by someone from an independent group

2.3 DELIVERABLES TAILORING

These deliverables in project planning may be done slightly differently for different types of projects.

Activity Deliverable	Low QA Focus	Medium QA Focus	High QA Focus
Life Cycle Model	Usually a variant of the waterfall	Usually one type of life cycle model, but may be more complex than waterfall, e.g. iterative/incremental	Probably combination of several life cycle models
WBS	Table in project plan	May be Excel spreadsheet or MS Project file	Built in tool such as MS Project; may be connected to process library tools
Size/effort estimate	Table in project plan	Documented assumptions in project plan, plus modest tool support, e.g. Excel spreadsheet	Likely to employ formal technique, e.g. Wideband Delphi, with associated deliverables; usually three-level estimate (i.e. best case, worst case, expected value)
Resource allocation	Sentence or two in project plan	Table in project plan	Usually captured in scheduling tool (e.g. MS Project)
Schedule	Table in project plan	May be Excel spreadsheet or MS Project file	Built in tool such as MS Project; has load-leveled resources
Budget	Table in project plan	May be Excel spreadsheet	Usually captured in budgeting tool

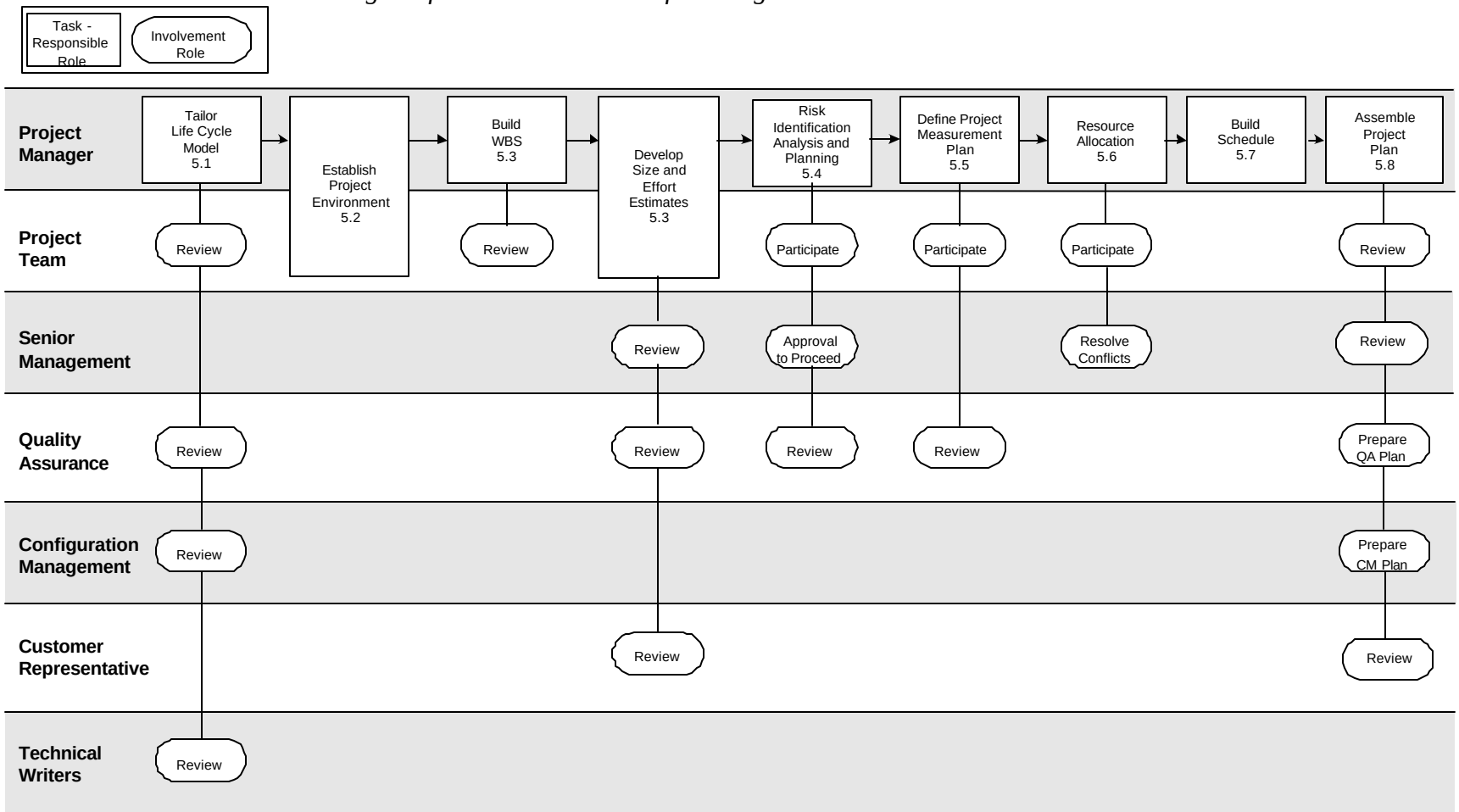
3. ROLES IN THE PROCESS

Role Names	Role Definitions
Project Manager	• Responsible for planning and tracking the project
Project Team	• Participates in building and reviewing the plan and project work items; developers or implementers of a system
Senior Management	• Authorizes the project and provides personnel and other resources • Reviews the plans to ensure they meet organization goals

Quality Assurance	• Participates in developing the plan, providing guidance on tailoring the organization's processes to suit the project • Reviews the plan for compliance to standards and organization processes
Configuration Management	• Reviews the plan to ensure configuration management has been addressed and adequate resources are available
Technical Writers	• Provides input on what needs to be done for the project, reviews the plan to ensure that documentation activities are included, information is available, and adequate resources are available
Customer Representative	• Represents the customer and/or user of the project results; provides input to the plan concerning requirements, may review the plan to ensure it meets user needs

4. GRAPHICAL OVERVIEW OF THE PROCESS

Note: The numbers in each rectangle refer to activities in the following section.



5. ACTIVITY DESCRIPTIONS

The following sections provide details on each activity: a description of the purpose, entry and exit criteria, and the sequence of tasks to be done. Tasks are shown along with the roles generally responsible and/or involved in those tasks. Note that initial project plan development should be done prior to, or in conjunction with, preparation of the Biennial Operating Plan[1].

5.1 TAILOR LIFE CYCLE MODEL TO PROJECT

If the organization usually follows one or more life cycle models, this activity tailors a specific approach for the project from that model (or models.) If there is no organization-preferred model, this activity defines its sequence of activities (life cycle) for the project plan.

Purpose: Select the appropriate activities and work products for this project.

Entry Criteria:

- A project manager has been assigned.
- The project scope has been defined in a statement of work or other similar document.
- User requirements have been established, at least at a high level.
- Other systems affected by this project have been identified.
- Candidate project team members have been identified.

Roles	Tasks
Project Manager	• Reviews goals, deliverables, team composition, and technologies available. • Identifies an appropriate project plan structure and template. • Reviews the available life cycle models with a quality assurance representative. • Develops the life cycle model of activities, work products, and reviews for this project and describes it in the project plan. This is the basis for the high-level work breakdown structure. • Sets up project folder or other mechanisms to collect project planning and performance information.
Project Team, Quality Assurance, Configuration Management, Technical Writers	• Review the project planning approach and project life cycle model

[1] *Quality Assurance Review Guide*, Version 1.0, November 1996, p. 15.

Exit Criteria:
- Project participants have reviewed the planning approach and project life cycle model and agree they are appropriate

5.2 ESTABLISH PROJECT ENVIRONMENT

To ensure a project can be run effectively, the environment must be established, with adequate project tools and facilities. The tasks in this activity may be done early in the planning cycle, done late in the cycle, or repeated several times, if the requirements are not completely known at the start of the project, or if the team composition changes during the project. *Note that this activity refers only to the tools and facilities needed to run the project, not the development environment*.

Purpose: Identify and procure the tools, materials, and facilities needed by the project team for this project.

Entry Criteria:
- Size of team and general approach to performing the project have been established
- Technology and life cycle model for project implementation have been identified.

Roles	Tasks
Project Manager	• Reviews selection criteria for methods and tools to support the technology and approach • Gathers selection team (perhaps a subset of the project team)
Project Team	• Selects methods and tools for the project to use. • Identifies team communication needs (networking, email, voice). • Examines needs of each project team member with respect to training in the methods, training and availability of tools, communication, space and other physical facilities.
Project Manager	• Arranges for training, tools, and facilities to meet needs.

Exit Criteria:
- Methods, tools, environment support are defined for the project.
- Environment and training needs have been identified for all members of the team.
- Arrangements have been made (or are in process) for necessary training, tools, and facilities.

5.3 CREATE WORK BREAKDOWN STRUCTURE

To be able to estimate the effort required to do the work on a project, and to determine the staffing needs, the first activity required is to carefully describe the work to be accomplished. The work items are documented in a work breakdown structure that provides for efficient planning and tracking.

In phase-based planning, the estimate, as well as the rest of the project plan, is reviewed and revised at the end of each life cycle phase. In this approach, a detailed estimate is prepared for the following phase, with an updated high-level estimate for remaining phases.

Purpose: Identify and describe the work elements in the project plan, any dependencies between them, and approximate level of effort of each.

Entry Criteria:
- Project requirements and goals are well-defined
- Life cycle, development approach, methods and tools have been selected

Roles	Tasks
Project Manager	• Drafts an initial list of work items by using statement of work, user requirements, and/or other documents describing the system to be built
Project Manager, Project Team	• Review the work elements to identify dependencies and ordering of work • Use an estimation process to create effort estimates for each work item
Project Manager	• Document the results as a Work Breakdown Structure (WBS) in the project plan (or a living document attached as an appendix to the project plan) • Review results with Customer Representative, Quality Assurance, and Senior Management to ensure all needed work is included

Exit Criteria:
- Project team members and other affected groups are in agreement with the estimates, the completeness of the list of work items, and the dependencies between them.

5.4 IDENTIFY PROJECT RISKS

At this point in the planning, and again at significant points of change in the project, the project team performs a risk identification process. This process is described in more detail in the *Process for Analyzing and Managing Project Risk*.

Purpose: Identify risk elements for this project, analyze them, and develop a risk management approach.

Entry Criteria:
- First version of Work Breakdown Structure is complete.

Roles	Tasks
Project Manager	• Identifies risk identification team and approach for identifying the risks • Project Manager documents risk management approach in the Project Development Plan
Project Team, others working with the team	• Uses risk factor tables (or other means) to identify risks • States the key risks to the project • Establishes estimates of probability, impact, and exposure (product of probability and impact) for each risk • Ranks risks using exposure estimates. • Develops management approach for top risks on the list. • Identifies those risks that require contingency plans and develops contingency plans.
Quality Assurance	• Reviews risk management approach
Senior Management	• Reviews risk list, risk exposures, mitigation approaches, and contingency plans • Decides whether or not to proceed with project
Project Manager	• Documents risk management approach in the Project Development Plan • Begins tracking risk management progress of project using Top Risks list

Exit Criteria:
- Team has considered all risks on the organization factor table.
- Management has agreed project should proceed, given the risk management approach
- Risk management approach is documented, and Top Risks chart has been published for team use.

5.5 DEFINE PROJECT MEASURES

Any project can benefit from using appropriate measures to track progress in dealing with its particular issues, objectives, and/or risks. This activity defines the most useful measures for a given project (see also *Process for Evaluating the Effectiveness and Efficiency of Information Resources Projects.*)

Purpose: Identify the key measures to be gathered for this project, what purposes they serve, and how reports will be published.

Entry Criteria:
- Project objectives and requirements have been established.

- Work Breakdown Structure has been developed.
- Risks have been identified.

Roles	Tasks

Project Manager, Project Team (or a subset)	• Identifies the key issues faced by the project, by examining project goals and objectives, project environment, risks, and other project characteristics
	• Maps the issues to categories of common issues, and reviews the measures available from industry knowledge for
	  • Project progress
	  • Product quality
	  • Process performance
	• Identifies any issues for which no industry measure will suffice, and defines an appropriate measure to address those issues.
	• Defines indicators that will be used to show the results of analysis of the measures, and decides when measures will be gathered, analyzed, and reported

Project Manager	• Prepares the measurement plan for the project, incorporating it into the overall project plan. • Identifies who will gather the measures at what points using what methods. • Reviews the set of planned measures with Quality Assurance and Senior Management. • Updates the measurement plan as needed, based on review.
Quality Assurance	• Reviews measurement plan for feasibility

Exit Criteria:
- All measures currently required by the organization are included in the plan.
- Measures have been defined to address all key project issues.
- All measures have definitions for gathering and reporting.

5.6 ALLOCATE WORK TO PERSONNEL

This activity generally is done in iteration with the scheduling activity, to accommodate schedule requirements and to address other issues and conflicts.

Purpose: Given the Work Breakdown Structure (WBS) and identified team members, determine which personnel are responsible for what work.

Entry Criteria:
- WBS and estimate have been developed.
- Statement of Work and/or user requirements document have been provided.

Roles	Tasks
Project Manager	• Discusses work to be done with individual team members, and determines best match of skills to work
Project Team	• Individuals agree to division of the work • Individuals provide calendar constraints and other input to help determine best fit of work to personnel
Project Manager	• Reviews match of personnel to work required and determines need for additional personnel or changes in personnel assignment • Identifies the needed support resources from Independent Test, Quality Assurance, Configuration Management, and Technical Writing. • Works with management to secure the needed personnel.
Senior Management	• Resolves conflicts in resource availability

Exit Criteria:
- All work elements in the WBS have personnel sufficient to accomplish the work.
- Personnel have the available time at the appropriate point in the schedule to accomplish the work.
- Management of the project team and support organizations have agreed to the staffing plan.
- Output of this activity is reviewed with output of the Create Work Breakdown Structure and Develop Initial Project Schedule activities, and they are consistent.

5.7 DEVELOP INITIAL PROJECT SCHEDULE

This activity is generally done in iteration with the allocation of personnel, since initial schedules often reveal conflicts in resource needs or dependencies between tasks. The result of this activity is the first project schedule, likely to be adjusted as the project proceeds and conditions change in the later phases of the project.

Purpose: Create an initial schedule of the work of the project.

Entry Criteria:
- Work Breakdown Structure has been developed.
- Personnel have been allocated and they have agreed to the work they can do for the project.

Roles	Tasks
Project Manager	• Uses the task list from the WBS, the effort estimates, and the personnel assignments as input to a project planning tool. • Generates initial schedule with the planning tool, and reviews results

Roles	Tasks
	to see that it meets project goals. • Uses project management tool and consultation with team to make any adjustments needed in order of the work, in assignment of personnel to the work, or in the specific WBS items included, to meet the project goals. • Negotiates changes, as needed, to modify project requirements to meet the project goals, given any resource constraints. • Negotiates changes, as needed, to modify personnel commitments to meet project goals, given requirements constraints. • Reviews complete initial schedule with Senior Management and all affected parties. • Documents resulting schedule in the project plan (or in a living document that is an appendix to the project plan).

Exit Criteria:
- The schedule is acceptable to all involved with the project.
- Work identified can be completed within the constraints of the current schedule.
- Output of this activity is reviewed with output of the Create Work Breakdown Structure and Allocate Project Resources activities, and they are consistent.

5.8 COMPLETE PROJECT DEVELOPMENT PLAN

Remaining portions of the Project Development Plan are completed, based on the organization plan template.

Purpose: Gather all plan(s) into their initial completed forms and ensure commitment of all affected groups.

Entry Criteria:
- Project life cycle has been tailored for this project.
- Initial WBS, resources, and schedule have been developed.
- Support team members have been identified.

Roles	Tasks
Project Manager	• Ensures a Software Quality Assurance Plan is written for the project. • Ensures a Configuration Management Plan is written for the project. • Completes the Project Development Plan.
Quality Assurance	• Writes Software Quality Assurance Plan.
Configuration Management	• Writes Configuration Management Plan.
Project Team	• Conducts a technical review of the plans.
Senior	• Review completed Project Development Plan.

Roles	Tasks
Management Customer representative	

Exit Criteria:
- All members of the team have read and agree with the project plans (Quality, CM, and Project Development Plan).
- Senior Management and the leaders of the support groups have approved the above plans.

6. MEASURES

Measures of the project progress, product quality, and process performance are included in the *Process for Project Monitoring and Control*. Measures that can be used to track and manage project planning activities include the following.

Handling of Project Planning **-** Track items such as the following:
- Schedule attainment – did planning begin and end on the dates planned?
- Effort required – compare the amount of planning effort to what was expected

7. VERIFICATION ACTIVITIES

While project planning is being done, the following verification activities are appropriate for management:
- Review the assumptions being used by the project manager and project team at the outset of planning. Ensure that any Statement of Work or project scope documents are available and correctly represent the project situation.
- Review drafts of project plan elements as they are developed, to provide input and feedback on team assumptions and requests for information.
- Review the final project plan, to ensure all management expectations are being met.

The following verification activities are appropriate for Quality Assurance personnel:
- Review drafts of project plan elements as they are developed, to provide input and feedback on team assumptions and requests for information.
- Review the planned approach of the project team, to ensure that is it using an appropriate tailoring of organization process assets.
- Review the final project plan, to ensure all customer expectations are being met, and that the plan meets organization standards.

8. DOCUMENT CONTROL

Revision	Date	Description
0.1	11/12/99	First draft; for internal review
0.2	11/23/99	Author revisions; added diagram in Section 4
0.3	12/7/99	Incorporated changes to tailoring section, diagram, page breaks
1.0	2/1/00	Incorporate Advisory Group revisions

A. ADDITIONAL RESOURCES

Project Planning Bibliography

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B. SUPPORTING TEMPLATES

Please see the following items, accessible separately:

- **Short Project Summary –** example of a minimal plan for a small project; this can also be used for tracking progress on the project
- **Project Development Plan template –** annotated outline of what should go into a generic project plan for a medium or large project; this can be used for software development or for other types of projects
- **WBS Elements from the Life Cycle Structure of IEEE 12207 –** list of WBS items that might be included in a life cycle for a project, with components for
  - Primary life cycles for acquisition, supply, development, maintenance, operations
  - Supporting processes for documentation, configuration management, quality assurance, verification, validation, joint review, audit, problem resolution
  - Organization processes for (project) management, infrastructure, improvement, and training

Please also see the supporting templates for risk management.

C. SUPPORTING CHECKLISTS

Please see the following checklist, accessible separately:

- **Project Planning Checklist** – items to consider when checking the work of a project team in building a project plan